**Integrating Environmental Restoration with Computer Science in New York Harbor with New York City Public Schools Phase II/PI Lauren Birney**

This project will advance efforts of the Innovative Technology Experiences for Students and Teachers (ITEST) program to better understand and promote practices that increase student motivations and capacities to pursue careers in fields of science, technology, engineering, or mathematics (STEM) by expanding and testing an innovative curriculum model that features locally relevant, problem-based learning. The curriculum model is organized around habitat restoration in New York harbor and will engage students and teachers in a sequence of activities that span the elementary, middle school, and high school grades of the nation's largest urban school system. Students will conduct field research in support of restoring native oyster habitats, and the project will be implemented by a broad partnership of institutions and community resources, including Pace University, the New York City Department of Education, the Columbia University Lamont-Doherty Earth Observatory, the New York Academy of Sciences, the New York Harbor Foundation, the New York Aquarium, and others. The project focuses on important concepts in the geological, environmental, and biological sciences that typically receives inadequate attention in schools: watersheds and the roles of keystone species. This project builds on and extends the Billion Oyster Project of the New York Harbor School. The project model includes several interrelated components, including: a teacher education curriculum that includes a component for elementary teachers that focuses on restoration science; a student learning curriculum; a digital platform for project resources; an aquarium exhibit; an after-school STEM mentoring program and a near-peer mentoring program; community based restoration science hubs, and advanced methods in restoration science for high school students that includes genetic barcoding (species ID), environmental DNA sampling and analysis, bacterial monitoring, and basic water chemistry analysis. The project targets students in low-income neighborhoods with high populations of English language learners and students from groups underrepresented in STEM fields and education pathways. The project will directly involve 97 schools, over 300 teachers, and approximately 15,000 K-12 students over a period of four years. A quasi-experimental, mixed-methods research plan will be used to assess the individual and collective effectiveness of project components. Multivariate analyses will be used to identify effective program aspects and assess the individual effectiveness of participation in various combinations of program components. Questions guiding the research include: 1. How does the project influence motivation and preparation to pursue STEM careers among K-12 students? 2. What aspects of the project have a positive influence on underrepresented students' motivation and preparation to pursue STEM careers, compared to other students? And 3. What curricular innovations associated with the project contribute to heightened awareness of and intent to pursue STEM careers among students? This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

